Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters	)	IB Docket No. 16-408

REPLY OF VIASAT, INC.

Viasat, Inc. submits this Reply in connection with its Petition for Reconsideration (the "Petition") of portions of the *Report and Order and Further Notice of Proposed Rulemaking* adopted on September 26, 2017 (the "*NGSO Order*").[1] The record reinforces the merits of Viasat's Petition and underscores the need for the Commission to reconsider the portions of the *NGSO Order*: (i) adopting equivalent power-flux density ("EPFD") limits that the Commission acknowledges are inadequate to protect geostationary orbit ("GSO") networks from harmful interference; (ii) not considering the request to allow secondary fixed-satellite service ("FSS") use of the 19.4-19.6 GHz and 29.1-29.25 GHz band segments; and (iii) creating uncertainty as to whether and how applicants may amend their pending non-geostationary orbit ("NSGO") applications to take advantage of rule changes effected by the *NGSO Order*.

I. THE RECORD UNDERSCORES THE NEED FOR THE COMMISSION TO DEVELOP AND ADOPT EPFD LIMITS THAT ACTUALLY—AND ADEQUATELY—PROTECT GSO OPERATIONS

Viasat's Petition demonstrated that the EPFD limits adopted in the *NGSO Order* are *not* sufficient to protect modern GSO networks. As Viasat explained, those EPFD limits: (i) are based on limits adopted by the International Telecommunication Union ("ITU") almost two decades ago, when very different satellite technologies, network architectures, and operating

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[1] *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, 32 FCC Rcd 7809 (2017) ("*NGSO Order*").

conditions existed; and (ii) do not address *aggregate* EPFD in the uplink direction, which could place modern GSO satellite receivers at risk from the simultaneous operation of multiple NGSO systems.[2] The Commission recognized in the *NGSO Order* that those "limits were not developed with the most advanced modern GSO networks in mind . . . ."[3] Yet, the Commission adopted the ITU EPFD limits because they were convenient, no party proposed alternative EPFD limits, and (for whatever reason) the Commission did not to attempt to develop EPFD limits of its own.

During this proceeding, Viasat provided extensive technical analysis to quantify the risk that NGSO systems operating at the ITU EPFD limits would pose to modern GSO networks.[4] Several parties now question the validity of that analysis—for the first time.[5] Viasat has no objection to vigorous debate with respect to such technical matters, which should have occurred prior to the adoption of the *NGSO Order* so that it could have informed the Commission's efforts to develop appropriate EPFD limits. That these issues are being newly debated at this late date underscores the problematic nature of the perfunctory decision to adopt the ITU EPFD limits.

The Commission should correct this matter by vacating that part of the *NGSO Order* and allowing this new technical debate to continue. In this respect, Viasat agrees with SES and O3b that where the Commission has received "limited input from stakeholders" and is faced with "uncertainty about future NGSO deployment," the solution is to seek such input and resolve such

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2 Petition at 2-5.

3 *NGSO Order* ¶ 35.

4 *See, e.g.*, Reply Comments of Viasat, Inc., IB Docket No. 16-408, at 9-11 (Apr. 10, 2017). Applicants in the pending processing rounds generally have proposed to operate well below the ITU EPFD limits, and Viasat would have no EPFD-related concerns with respect to operations at those proposed levels. However, the Commission has authorized several licensees to operate at higher levels, up to and including the ITU EPFD limits. At the same time, Section 25.289 of the Commission's rules suggests that any interference resulting from operations at these authorized EPFD levels would be permitted, with GSO operators having no recourse with respect to such interference. *See* 47 C.F.R. § 25.289.

5 *See generally* nn.7-10, *infra*.

uncertainty—not simply to decide in the face of incomplete information.[6] To facilitate what should be ongoing discussion with respect to these matters, Viasat offers the following responses to new technical arguments raised by certain parties:

- ***OneWeb.*** OneWeb asserts that the ITU EPFD limits "are sufficient to fully protect GSO operations," based solely on the fact that the "analyses that led to the creation of the [ITU] limits" *almost two decades ago* involved significant Commission and U.S. industry input.[7] Viasat has never asserted that the process of adopting the ITU's EPFD limits was flawed, or that the resulting EPFD limits did not reflect the GSO networks and NGSO operating environment that were prevalent at that time—issues which are simply irrelevant now. The pertinent question is whether the ITU's EPFD limits are adequate to protect modern GSO networks in the current NGSO operating environment, and the record evidence clearly shows that they are not.

- ***Telesat Canada.*** Telesat Canada asserts that its "worst-case analysis" concludes that a GSO satellite would not be harmed by a Ka-Band NGSO system operating at the "maximum power level specified in Table 22-1B of Article 22" of the ITU Radio Regulations.[8] Critically, Table 22-1B specifies EPFD limits in the *downlink* direction. Viasat's concerns relate to the inadequacy of the ITU EPFD limits in the *uplink* direction (single entry and aggregate), and nothing in Telesat Canada's analysis addresses that issue. As such, Telesat Canada's argument is inapposite.

- ***Boeing.*** Boeing suggests the ITU EPFD limits are adequate because: (i) newer NGSO system designs limit interference potential into GSO networks; and (ii) NGSO operators that are also GSO operators are incented to protect GSO networks.[9] But the Commission cannot and should not rely on certain NGSO operators—private, self-interested actors—to ensure that the GSO networks of their competitors are protected. The Commission's rules (including its EPFD limits) afford NGSO systems the flexibility to operate in ways that could create significant interference potential and, contrary to Boeing's flawed logic, NGSO operators have the natural economic incentive to use that flexibility. Moreover, those NGSO applicants that do not operate GSO networks have *no* incentive or reason to protect *any* GSO operations

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6 *See* Opposition and Response of SES Americom, Inc. and O3b Limited to Petitions for Reconsideration, GN Docket No. 16-408, at 4 (Feb. 20. 2018) ("SES/O3b Response"). SES and O3b correctly note that the Commission could "reopen the topic on reconsideration or in a Public Notice to allow stakeholders to submit additional studies and proposals and work with the Commission to develop a viable regulatory solution for aggregate EPFDup limits."

7 *See* Comments of WorldVu Satellites Limited, IB Docket No. 16-408, at 4 (Feb. 20, 2018) ("OneWeb Comments").

8 *See* Opposition of Telesat Canada to Petition for Reconsideration of Viasat, Inc., IB Docket No. 16-408, at 1-2 (Feb. 20, 2018).

9 *See* Opposition of The Boeing Company, IB Docket No. 16-408, at 8 (Feb. 20, 2018).

absent appropriate regulatory requirements. And NGSO applicants that operate GSO networks may be willing to sacrifice GSO network performance to bolster the performance of their NGSO systems, particularly where doing so also adversely affects competitors' operations. The Commission—and not NGSO operators—can, should, and must balance these competing interests.

- ***SpaceX.*** SpaceX asserts that the "ITU EPFD limits are more protective of the new generation of satellites than those the rules were originally intended to protect" and that the interference risk posed by NGSO systems is mitigated by the smaller beam coverage of modern GSO satellites as compared to the ITU reference beams.[10] This flawed assertion, which is based on incorrect calculations and unrealistic assumptions,[11] holds *only* where relevant NGSO earth stations are uniformly distributed over the relevant coverage area. Where that condition is not met (and there is no reason to conclude it would be met), NGSO uplinks operating at the ITU EPFD limits pose a demonstrable risk of harmful interference to modern GSO satellites.[12] The Commission cannot and should not adopt EPFD limits that protect GSO networks *only* when NGSO systems deploy is a particular manner.

In short, Viasat's technical analysis continues to provide clear justification for the Commission to reconsider its adoption of the ITU EFPD limits in the *NGSO Order*. If the Commission nevertheless decides to retain those EPFD limits, it should at least afford GSO operators a mechanism for soliciting the Commission's assistance in remedying any NGSO-to-GSO interference that may occur in the future. The Commission could accomplish this goal by deleting the second and third sentences of Section 25.289 of the Commission's rules. This change would make clear that NGSO systems have an overriding obligation to protect GSO

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10 Space Exploration Technologies Corp. Response to Petitions for Reconsideration, IB Docket No. 16-408, at 12 (Feb. 10, 2018).

11 For example, SpaceX claims that the "area covered by Viasat's antenna is a mere 1/4000th of the area covered by the ITU reference antenna," *id.* at 11, even though the beamwidth of Viasat's second-generation GSO satellites is 0.21° and the beamwidth of the ITU reference pattern is 1.55°, suggesting that Viasat's antenna actually covers approximately $1/55^{th}$ the area covered by the ITU reference antenna (or $(0.21^o/1.55^o)^2$).

12 For example, if a NGSO system had a single operational earth station in the northeastern United States (*e.g.,* in New York City), its EPFDup could be at the ITU limit. In that case, as shown by Viasat's analysis, a high-gain GSO network uplink beam covering New York City could experience a 26-percent throughput reduction. Many combinations of NGSO system earth station deployment patterns and power settings would comply with the ITU EPFDup limit and still cause significant harm to GSO network uplinks.

networks, and that GSO operators retain the ability to seek recourse from the Commission where the ITU EPFD limits prove inadequate. Given the claims made by OneWeb, Telesat Canada, Boeing, and SpaceX in response to Viasat's Petition, there can be no reasonable basis for them to oppose this requested change. Any such opposition would represent an implicit concession that there are instances in which the ITU EPFD limits are inadequate to protect GSO networks.

II. THE RECORD REFLECTS THAT THE COMMISSION *SHOULD* EXAMINE FSS USE OF THE 19.4-19.6 GHZ AND 29.1-29.25 GHZ BAND SEGMENTS IN THIS PROCEEDING

In its comments, ViaSat proposed making the 19.4-19.6 GHz and 29.1-29.25 GHz band segments available for secondary FSS use (consistent with the Commission's proposal to make other NGSO MSS feeder link band segments available for such use). The *NGSO Order* did not address the substance of Viasat's proposal, but merely asserted that the proposal "falls outside the present rulemaking."[13] In its Petition, Viasat showed that its proposal was entirely consistent with the clear intent and specific language of the *NPRM*, which invited such proposals.

The record reflects strong support for Viasat's position. SES agrees that this proposal is within the scope of the *NPRM* and consistent with previous occasions on which the Commission has sought to foster "new methods for enhancing the efficient use of spectrum to facilitate the deployment of innovative services . . . in the public interest."[14] Similarly, OneWeb notes that "there are no real technical barriers to spectrum sharing between NGSO FSS and MSS operators in these bands, and considering the Commission's consistent stance on spectrum sharing, opening up these underutilized bands for NGSO FSS use is consistent with the Commission's stated policy objectives . . . ."[15]

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13 *NGSO Order* ¶ 18 n.40.

14 SES/O3b Response at 4.

15 OneWeb Comments at 4.

Only a single party—Iridium—opposes Viasat's request for reconsideration of this aspect of the *NGSO Order*.[16] Iridium's opposition is entirely self-serving and consistent with its other efforts to block shared access to spectrum that has been underutilized for far too long. In any event, Iridium's analysis is demonstrably flawed for several reasons.

First, Iridium's position is grounded entirely in its incorrect assertion that the *NPRM* "expressly" excludes any consideration of the 19.4-19.6 GHz and 29.1-29.25 GHz band segments in this proceeding.[17] The untenable nature of this position is underscored by Iridium's failure to cite *any* language in which the Commission "explicitly, clearly, directly, plainly, distinctly, unambiguously, unequivocally, unmistakably, obviously, [or] absolutely"[18]—*i.e.,* "expressly"— excludes those band segments from consideration. The reason is simple—such language does not exist. To the contrary, as Viasat noted in its Petition, the *NPRM* "expressly" invited proposals not specifically identified by the Commission in the *NPRM* (such as Viasat's).

Iridium is really making a much more limited claim—that the 19.4-19.6 GHz and 29.1-29.25 GHz band segments were not specifically addressed in the *NRPM*. But just as "absence of evidence is not evidence of absence," absence of language specifically calling for consideration of the 19.4-19.6 GHz and 29.1-29.25 GHz band segments is not evidence of the Commission's intent to *preclude* consideration of those band segments in this proceeding. Any contrary approach would undermine one of the primary purposes of notice-and-comment rulemaking—to solicit the public's assistance in identifying *additional* information, considerations, and approaches that did *not* occur to the Commission in drafting the underlying notice.

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16 *See* Opposition of Iridium Satellite LLC, IB Docket No. 16-408 (Feb. 20, 2018) ("Iridium Opposition").

17 *See, e.g., id.* at 2.

18 *See* https://en.oxforddictionaries.com/thesaurus/expressly (last visited Mar. 1, 2018).

Iridium is also incorrect in assuming that the Commission's attempts to facilitate FSS access to spectrum "designated for, but unused by, NGSO MSS feeder links" necessarily excludes spectrum used for Iridium's feeder links.[19] This assumption ignores the geographic dimension of spectrum use—*i.e.,* the fact that spectrum can be "used" in one location but not another. This notion is the basis for many of the Commission's foundational spectrum sharing and coordination policies and frameworks—*e.g.,* that permitting wireless use of broadcast television "white spaces" on a market-by-market basis. As the Commission is well aware, Iridium's limited feeder link deployment leaves 19.4-19.6 GHz and 29.1-29.25 GHz band segments effectively unused over large swaths of the United States.[20] And the analysis on record in the proceeding regarding FSS earth stations in motion ("ESIMs") demonstrates that co-frequency, co-coverage sharing with certain GSO operations is feasible, and would result in more efficient use of the limited spectral resource.[21]

Iridium wholly mischaracterizes the nature of Viasat's position; Viasat never suggested that the Commission was "somehow mistaken" in drafting *NPRM* language that did not specifically identify the 19.4-19.6 GHz and 29.1-29.25 GHz band segments in the *NPRM*. Rather, Viasat noted that: (i) the *NPRM* proposed several ways that Ka-band spectrum, including spectrum historically allocated or NGSO MSS feeder link operations, could be used more efficiently; (ii) the *NPRM* broadly solicited additional proposals that could advance the objectives set forth in the *NPRM*—including, among other things, enhanced spectral efficiency; and (iii) Viasat's proposal was entirely consistent with that broad solicitation.

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19 *See* Iridium Opposition at 6.

20 *See, e.g., Inmarsat Mobile Networks Inc.*, 30 FCC Rcd. 2770, at ¶ 27 (2015).

21 *See, e.g.,* Notice of *Ex Parte* Presentation by Viasat, Inc. and Inmarsat, IB Docket No. 17-95 (filed Nov. 6, 2017).

And Iridium's opposition underscores the inherent flaws in its assertion that Viasat's proposal was not a "logical outgrowth" of the *NPRM*. As noted in Viasat's Petition, the "logical outgrowth" test is chiefly concerned with ensuring that interested parties have "fair notice" of potential agency actions,[22] and the "crux" of the test is simply whether a potential rule change is "reasonably foreseeable."[23] Iridium's position that it had "no reason to believe that the Commission would do precisely what it proposed not to do and permit FSS operations in MSS feeder-link bands that are in use by a licensed operator"[24] is belied by Iridium's own comments in response to the *NPRM*. As Viasat noted in its Petition, Iridium's comments:

- Observed that the "proposal in the *NPRM* for the 19 GHz and 29 GHz Sub-bands, if adopted, will put additional strain on Iridium's feeder link operations."
- Further acknowledged that "there is interest among GSO FSS licensees to seek rule changes that would permit them to operate earth stations in motion in the Iridium Feeder Link Bands."
- Specifically noted that "multiple applicants in the Commission's NGSO FSS processing round have proposed to make use of the [19.4-19.6 GHz and 29.1-29.35 GHz band segments]"—an acknowledgment that Viasat's proposal would "formally enable the spectrum use proposed by NGSO FSS broadband constellations currently pending before the Commission," consistent with the intent of the *NPRM*.

Iridium has no response to this analysis, and no plausible basis for claiming Viasat's proposal was not "reasonably foreseeable" given Iridium's own statements—which were made even before Viasat's proposal was included in the record of this proceeding.

III. THE RECORD UNDERSCORES THE NEED FOR CONFIRMATION THAT APPLICANTS IN PENDING PROCESSING ROUNDS MAY AMEND THEIR APPLICATIONS TO TAKE ADVANTAGE OF THE *NGSO ORDER*

In its Petition, Viasat explained that the *NGSO Order* grants significant new flexibility to NGSO operators, but does not explicitly address how pending applicants will be permitted to

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22 *Long Island Care at Home, Ltd. v. Coke*, 551 U.S. 158, 174 (2007).

23 *Id.*

24 *See* Iridium Opposition at 8.

take advantage of this new flexibility. Viasat demonstrated that the Commission could advance the policy objectives underlying its recent rule changes, and avoid inequitable results, by clarifying that applicants may make changes to their proposed NGSO systems in light of the *NGSO Order* without such changes constituting "major" amendments (which, absent a waiver, could preclude consideration of the underlying applications in a processing round).[25]

The record reflects strong support for what should be an uncontroversial position. For example, OneWeb agrees that allowing parties to amend their pending applications or petitions while remaining in the processing round would: "(i) prevent inequitable results due to rule changes during processing rounds and (ii) ensure needed regulatory certainty."[26] As OneWeb puts it, rewarding operators that chose a "cavalier approach to regulatory compliance" by seeking waivers of baseline rules and application requirements and allowing those operators "to reap a regulatory windfall under the revised NGSO" would be "an inequitable outcome that is not in the public interest."[27]

Only SpaceX opposes Viasat's request. SpaceX argues that Section 25.116(c) of the Commission's rules prohibits major amendments outside of an NGSO processing round and should be strictly enforced here. This proves nothing. The existence of Section 25.116(c) is *why* Viasat has sought clarification through its Petition; Viasat does not believe that the Commission intended the sort of inequitable result suggested by Section 25.116(c) when it made significant changes to its NGSO regulatory framework (*e.g.*, with respect to required geographic coverage and milestones) in the *NGSO Order*; particularly as the *NPRM* was issued *after* the filing window for the Ka-band processing round closed.

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25 *See* 47 C.F.R. § 25.116.

26 OneWeb Comments at 2.

27 *Id.* at 3.

SpaceX suggests that "[a]ny other conclusion" would effectively vacate each of the Commission's ongoing NGSO processing rounds. Notably, there are only *two* such rounds, and the clarification Viasat seeks will have limited application on a going-forward basis; the confusion around the availability of amendments arises only because the Commission initiated those processing rounds before it even proposed to update baseline rules and application requirements—a situation not likely to be repeated again in the near future. Regardless of whether this circumstance has occurred before, basic concepts of fairness dictate that applicants that sought waivers of rules that the Commission subsequently abrogated should not be allowed to leverage that advantage against those who complied with the rules in effect at the time.

IV. CONCLUSION

Viasat urges the Commission to reconsider the *NGSO Order* for the reasons set forth herein.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Kayla Ernst, hereby certify that on this 5th day of March, 2018, I served a true copy of the foregoing Reply of ViaSat, Inc. via first-class mail upon the following:

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